

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of transmitting receiving data on a burst signal basis, the method comprising the steps of:

inserting a data symbol having a higher modulation level and a data symbol having a lower modulation level partially on a symbol basis based on a communication control information into a transmission burst formed at transmission; ~~and~~

wherein the higher modulation level has more modulation levels than the lower modulation level,

wherein the communication control information is information for determining the modulation level on respective data symbols, the communication control information being known to a receiver; and

transmitting the transmission burst including the data symbol having the higher modulation level and the data symbol having the lower modulation level inserted in the inserting step;

2. (Currently Amended) A method of receiving data on a burst signal basis, the method comprising the steps of:

receiving a burst signal ~~data transmitted on a burst signal basis;~~ and

detecting a data symbol in response to respective a- data symbol positions where ~~at the~~ data symbol having a higher modulation level and a symbol having a lower modulation level and being inserted in the burst signal received in the receiving step are is placed based on a communication control information, the information being for determining a modulation level on respective data symbols and known to a transmitter, ~~and in response to a symbol position where a symbol other than the foregoing symbol is placed.~~

3. (Currently Amended) A transmission device of a communication system that carries out communication on a burst basis by digital modulation, the transmission device comprising:

a data stream dividing means for dividing transmission data at a given ratio;

a first quadrature vector mapping means for providing a first divided data with a signal space diagram according to a first modulation method;

a second quadrature vector mapping means for providing a second divided data with a signal space diagram according to a second modulation method having a higher modulation level than the first modulation method based on a communication control information, the information being for determining a modulation level on respective data symbols and known to a receiver; and

a multiplexing means for placing a symbol modulated by the first modulation method and a symbol modulated by the second modulation method at given places respectively, then multiplexing a transmission burst.

4. (Currently Amended) A reception device of a communication system that carries out communication on a burst basis by digital modulation, the reception device comprising:

a reception process means for receiving a communication signal, then outputting a burst signal of the signal received;

a dividing means for dividing the burst signal received based on a communication control information, the information being for determining a modulation level on respective data symbols and known to a transmitter in response to given places;

a first symbol detecting means for providing a first divided signal with symbol detection in response to a first modulation method;

a second symbol detecting means for providing a second divided signal with symbol detection in response to a second modulation method having a higher modulation level than the first modulation method; and

a data stream multiplexing means for placing a result detected by the first symbol detecting means and a result detected by the second symbol detecting means in a given order, and multiplexing a reception data stream.

5. (Currently Amended) The method of transmitting data as defined in claim 1, wherein the communication control information is a information representing: when communication quality is different at each data_symbol position in the burst, a place where the data_symbol having thea higher modulation level is inserted ~~or a place where a symbol modulated by a second modulation method having a higher modulation level is inserted~~ is assigned to a symbol position of which communication quality is considered in advance better than other data_symbol positions.

6. (Currently Amended) The method of receiving data as defined in claim 2, wherein the communication control information is a information representing: when communication quality is different at each data_symbol position in the burst, a place where the data_symbol having thea higher modulation level is inserted ~~or a place where a symbol modulated by a second modulation method having a higher modulation level is inserted~~ is assigned to a symbol position of which communication quality is considered in advance better than other data_symbol positions.

7. (Currently Amended) The transmission device as defined in claim 3 further comprising:

a communication quality information obtaining means for obtaining information about whether or not communication quality is different at each data_symbol position in the burst; and

an insertion place detecting means for assigning, based on the information about difference in the communication quality, ~~one of a place where the symbol having a higher modulation level is inserted and a place where a symbol modulated by thea~~ second modulation method to a data_symbol position of which communication quality is better than other data_symbol positions.

8. (Currently Amended) The reception device as defined in claim 4 further comprising:

a communication quality measuring means for measuring communication quality at each data_symbol position in the burst;

a communication quality information notifying means for notifying a transmission device of information about the communication quality measured by the communication quality measuring means; and

an insertion place information obtaining means for obtaining information about a place where thea data_symbol having thea higher modulation level is inserted.

9. (Currently Amended) A communication system comprising:

a reception device including:

a reception quality measuring means for measuring reception quality at each data_symbol position in a burst received; and

a reception quality information notifying means for notifying a transmission device of information about reception quality measured by the reception quality measuring means, and

the transmission device including:

a communication quality information obtaining means for obtaining the information about the reception quality notified by the reception device; and

an insertion place detecting means for assigning, based on the reception quality information, an insertion place to a data_symbol position of which communication quality is better than another data_symbol position.

10. (Currently Amended) The transmission device as defined in claim 3, wherein when the transmission device re-transmits, following a request signal of re-transmission, a part of redundant data of a burst already transmitted, the transmission device further comprises a means for superposing the partial redundant data to be re-transmitted to a data_symbol position of thea data symbol having thea higher modulation level.

11. (Original) The transmission device as defined in claim 10 further comprising:

an error correction coding means for correcting an error of a transmission data stream, outputting a coded data stream, and outputting a redundant section deleted at the coding through another channel;

a memory means for storing temporarily the section deleted; and

a re-transmission control means for supplying data of the redundant section stored to the second quadrature vector mapping means for superposing the re-transmitted partial data.

12. (Currently Amended) The method of transmitting data as defined in claim 1, wherein in the step of inserting thea data symbol having thea higher modulation level, known bit data is inserted in a part of the data symbol having thea higher modulation level, so that a signal space diagram at a modulation is limited.

13. (Currently Amended) The method of receiving data as defined in claim 2 further comprising the step of:

estimating reception quality of a signal received by using a vector of the signal received at a data symbol position of the data symbol having thea higher modulation level, the data symbol having the higher modulation level being inserted in the burst partially on a symbol basis, which vector is inserted on a symbol basis in a part of a burst.

14. (Currently Amended) The reception device as defined in claim 4 further comprising a reception quality estimating means for ~~estimating communication quality~~ by limiting a placement of signal points by ~~with~~ insertion of known bit data in a part of bits, and estimating communication quality by using a vector of a reception signal at a symbol position undergone a signal space diagram by the second modulation method.

15. (Currently Amended) The transmission device as defined in claim 3, wherein a signal space diagram of ~~a symbol having a higher modulation level or a data~~ a symbol undergone a signal space diagram by the second modulation method is

placed away by a given Euclidean distance in response to an amplitude of a data symbol undergone a signal space diagram by the first modulation method.

16. (Currently Amended) The reception device as defined in claim 4, wherein a signal space diagram of ~~a symbol having a higher modulation level or a~~ data symbol undergone a signal space diagram by the second modulation method is placed away by a given Euclidean distance in response to an amplitude of a data symbol undergone a signal space diagram by the first modulation method, and the second data symbol detecting means detects the data symbol placed as discussed above.

17. (Currently Amended) The transmission device as defined in claim 3 further comprising:

a transmission packet generating means for generating and outputting transmission data on a packet basis based on a process in a higher layer, and also generating a transmission packet which outputs information about a size of the packet; and

a transmission control means for detecting a quantity and an insertion place of ~~the~~ data symbol having ~~the~~ higher modulation level based on the information about a size of the transmission packet and information about a size of a burst in a physical layer, and for controlling a data separation by the data stream dividing means and a content of the burst generated by the multiplexing means based on information about a determined quantity and a determined insertion place about the symbol.

18. (Original) The transmission device as defined in claim 17, wherein the transmission control means controls the multiplexing means such that the information about the packet size is inserted in the transmission burst.

19. (Currently Amended) The method of transmitting data as defined in claim 1 further comprising the steps of:

generating and outputting transmission data on a packet basis based on a process in a higher layer, and also generating a transmission packet which outputs information about a size of the packet; and

controlling transmission for detecting a quantity and an insertion place of thea data symbol having thea higher modulation level based on the information about a size of the transmission packet and information about a size of a burst in a physical layer, and controlling a data separation in a data stream dividing step for dividing a data stream based on information about a determined quantity and a determined insertion place about the symbol, and also controlling a content of the burst generated in a multiplexing step which generates a transmission burst.

20. (Original) The method of transmitting data as defined in claim 19, wherein the transmission control step controls the multiplexing step such that the information about the packet size is inserted in the transmission burst.

21. (Original) The reception device as defined in claim 4, wherein data to be received is generated in a higher layer on a packet basis, and the reception device further comprises:

a reception control means for controlling a data separation by the dividing means and a content of the burst generated by the data stream multiplexing means based on information about a size of a transmission packet; and

a reception packet generating means for reconstructing packet data in the higher layer transmitted by using data of each reception burst supplied from the data stream multiplexing means.

22. (Original) The reception device as defined in claim 21, wherein the information about a size of a transmission packet is inserted in the reception burst, and a reception control means extracts a size of the transmission packet inserted in the burst.

23. (Original) The method of receiving data as defined in claim 2, wherein data to be received is generated in a higher layer on a packet basis, and the method further comprises the steps of:

reception controlling for controlling a data separation in a dividing step and a content of the burst generated in a data stream multiplexing step based on information about a size of a transmission packet; and

generating a reception packet for reconstructing packet data in the higher layer transmitted by using data of each reception burst supplied from the data stream multiplexing step.

24. (Original) The method of receiving data as defined in claim 23, wherein the information about a size of a transmission packet is inserted in the reception burst, and the reception controlling step extracts the size of the transmission packet inserted in the burst.